TOPIC- GENDER RECOGNITION BY VOICE SYSTEM

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Gender Recognition By Voice System

**Introduction**

This database was created to identify a voice as male or female, based upon acoustic properties of the voice and speech. The dataset consists of 3,168 recorded voice samples, collected from male and female speakers. The voice samples are pre-processed by acoustic analysis in R using the seewave and tuneR packages, with an analysed frequency range of 0hz-280hz ([human vocal range](https://en.wikipedia.org/wiki/Voice_frequency#Fundamental_frequency)).

## The Dataset (voice.csv)

The following acoustic properties of each voice are measured and included within the CSV:

* **meanfreq**: mean frequency (in kHz)
* **sd**: standard deviation of frequency
* **median**: median frequency (in kHz)
* **Q25**: first quantile (in kHz)
* **Q75**: third quantile (in kHz)
* **IQR**: interquantile range (in kHz)
* **skew**: skewness (see note in specprop description)
* **kurt**: kurtosis (see note in specprop description)
* **sp.ent**: spectral entropy
* **sfm**: spectral flatness
* **mode**: mode frequency
* **centroid**: frequency centroid (see specprop)
* **peakf**: peak frequency (frequency with highest energy)
* **meanfun**: average of fundamental frequency measured across acoustic signal
* **minfun**: minimum fundamental frequency measured across acoustic signal
* **maxfun**: maximum fundamental frequency measured across acoustic signal
* **meandom**: average of dominant frequency measured across acoustic signal
* **mindom**: minimum of dominant frequency measured across acoustic signal
* **maxdom**: maximum of dominant frequency measured across acoustic signal
* **dfrange**: range of dominant frequency measured across acoustic signal
* **modindx**: modulation index. Calculated as the accumulated absolute difference between adjacent measurements of fundamental frequencies divided by the frequency range
* **label**: male or female

**Proposed Method**

**K-NN classifier**

* Using K-NN classifier to distinguish whether the voice sample is that of a male or female.
* The elbow method was used to pick an optimum K-value (no. of neighbours)

**Result**

* The dataset contained 3168 records, 2376 of which were used as training set and the rest as test set.
* The system results in a **95%** accuracy of gender detection.
* The code can be further optimized using multi-threading, acceleration libs and multi-processing.